BIOLOGICAL CONTROL OF WEEDS IN ND

BACKGROUND, HISTORY, AND UPDATES

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Presentation Topics

- **Background on what is Biological Control**
- **Weed biocontrol projects in North Dakota**
- **History and Updates**

What is Biological Control?

The deliberate use of a weeds *natural enemies* to reduce the weed's abundance and negative impacts

Biological control

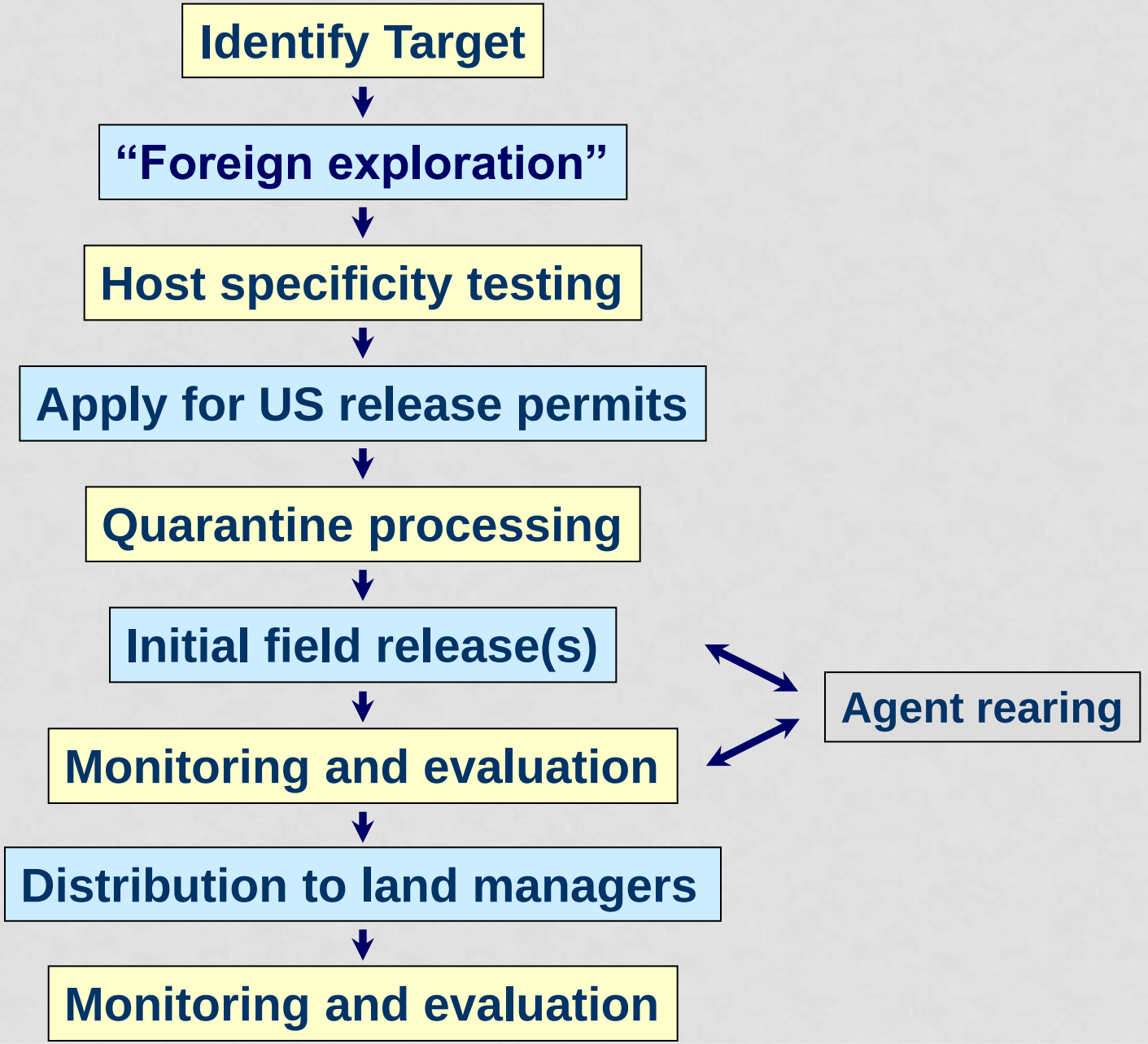
Weed management tool ("classical biological control")

- applied use of natural enemies
- involves direct management

Exotic weeds become economic problems in the US because they are introduced without natural enemies

- Classic biological control is an attempt to establish at least some of the weed's natural enemies

Classical biological control: the process



Classical biological control

Advantages

- Host specificity
- Permanence
- Ability to spread
- Relatively little ‘environmental impact’
- Pests do not develop resistance
- Usually highly cost-effective

Disadvantages

- Long time frame
- Ability to spread
- Eradication not an option
- Not all weeds are suitable targets

National Weed Biocontrol Targets:

- About 600 exotic weeds in US
- About 78 weeds (13%) targets of Biocontrol projects
- Substantial or complete weed control in 25-33% of projects

North Dakota Weed Biocontrol Targets:

- Leafy spurge
- Canada thistle
- Purple loosestrife
- Spotted knapweed
- Musk thistle
- Dalmatian toadflax
- Yellow toadflax
- Field bindweed

Highlights of some North Dakota Biocontrol Projects

Leafy Spurge

Approx 875,000 acres reported in ND

- **First detected in 1909 at Fargo**

- **A 1991 study by NDSU estimated the direct annual financial impact in the Dakota's, Montana, and Wyoming to be $144 million.**

- **1989: Brown flea beetle released in US**
- **1992: Black flea beetle released in US**
- **1994: Harvesting techniques developed and major redistribution effort begins**
- **1996: Flea beetles exist state-wide and greatly contribute to control**

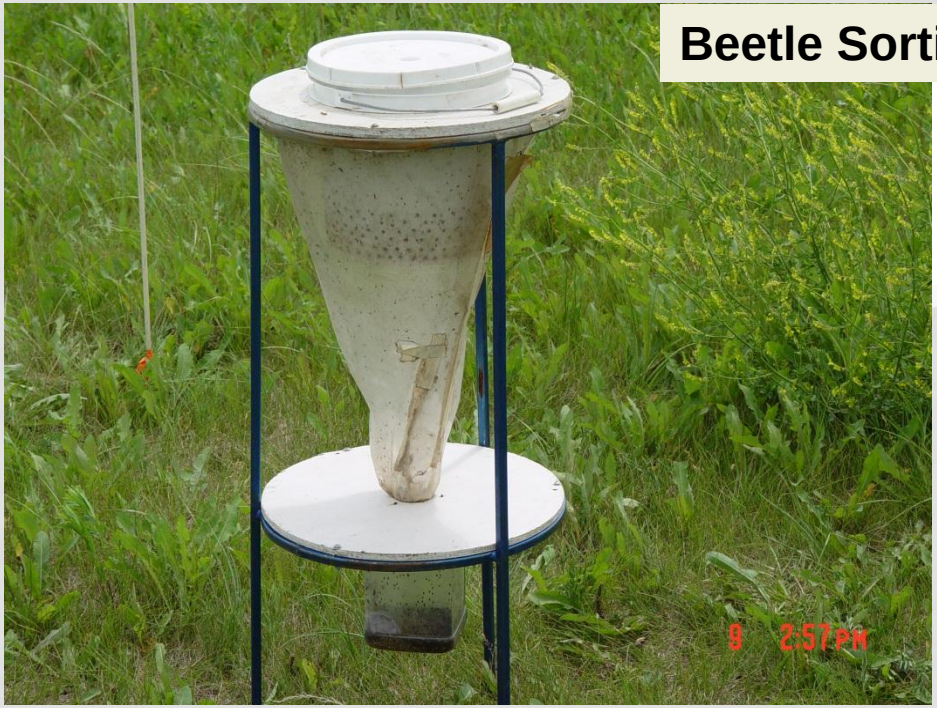
2012 Biocontrol Status:

- **Populations rebound following several cool and wet summers. Harvesting productive**
- **Black beetles regain dominance in western counties**


Harvesting Leafy Spurge beetles
near Valley City, North Dakota

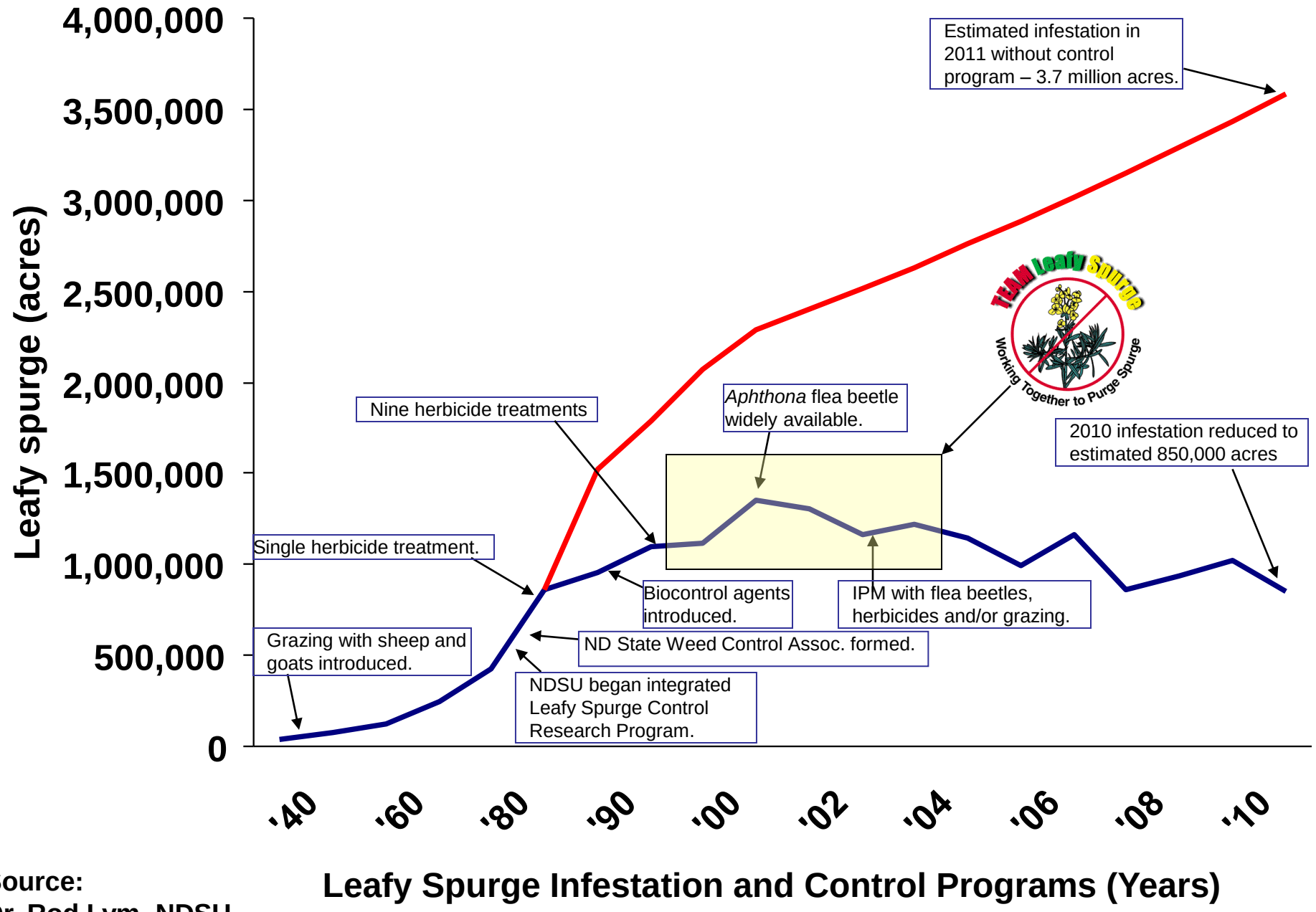

Weed control workshop and biocontrol presentation. Jamestown, North Dakota

Beetle Sorting Process



Hawks Nest Butte, North Dakota before spurge beetles

Hawks Nest after spurge beetles



Leafy Spurge Infestation and Control Programs (Years)

Source:
Dr. Rod Lym, NDSU

CANADA THISTLE

Approx 825,000 acres reported in ND

- 1998: Several biocontrol agents established - Stem weevil proves most effective
- 2004: NDDA distributes weevils statewide
- 2008: Monitoring project begins, documents establishment and site preference information assembled

2012 Biocontrol Status:

- Significant acreage reductions noted and local supply established
- Simple harvesting techniques needed

Stem weevil

Results

- Many sites could be used as insectaries
- Simple harvest techniques need inventing

Purple Loosestrife

Approx 300 acres reported in ND

- **1997: 3 biocontrol agents released**
- **2000: Galerucella proves most effective**

2012 Biocontrol Status

- **Populations established**
- **Impacted by mosquito control efforts**
- **Herbicide spraying also needed**
- **Loosestrife acreage largely under control**


Typical Purple Loosestrife infestation.
Sheyenne River, North Dakota

Release of Galerucella on Purple Loosestrife. Sheyenne River, North Dakota

Destroyed purple loosestrife plants due to Galerucella larval grazing. Sheyenne River, North Dakota

Spotted knapweed

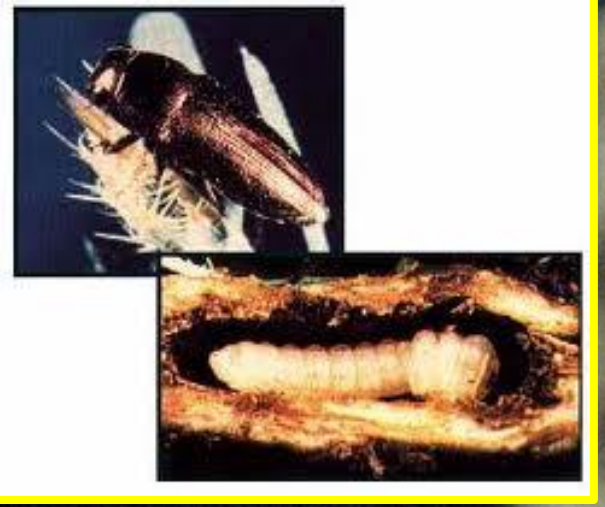
Approx 3,700 acres reported in ND

- **1999: 3 biocontrol agents released in ND**
- **2000: Larinus weevils proved most effective**

2012 Biocontrol Status:

- **Established but work very slowly**
- **Chemical treatments/containment must continue**

Release of Larinus on spotted knapweed.
Sentinel Butte, North Dakota



Dead knapweed rosette showing Sphenoptera activity. Sentinel Butte, North Dakota

Searching for Agapeta with Black light trap
Minot, North Dakota

Yellow toadflax

Approx 15,000 acres reported

- **2010: First stem weevil releases in ND**

2012 Biocontrol Status:

- **Some evidence of establishment in Ward County but results inconclusive**


Russian Olive invasion of riparian zone.
Yellowstone River, North Dakota

Biocontrol of Russian Olive?

- **Some benefits of planting Russian olive**
- **Russian olive has been spreading to such an extent that the economic and environmental damage caused by the woody invader may soon outweigh its horticultural benefits nationally**
- **Focus on biological control agents that reduce the seed output only**
- **Control the spread of this invader without killing established trees**

Chemically treated Saltcedar using a marker dye adjuvant to ensure proper coverage. Lake Sakakawea, North Dakota

Biocontrol agents are available but not used in ND

Lessons learned from 25 years of weed biocontrol in North Dakota

- **Has proved to be a valuable tool that can be used in an Integrated Pest Management Program**
- **Not the silver bullet that everyone hopes for**
- **Can’t put away the spray rig**
- **Chemical containment and eradication of new patches always needed even in best case scenarios**
- **Don’t use with new invasive species: Go with early detection and eradication**

Questions?

Thanks very much